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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,163	03/30/2001	Konstantine I. Iourcha	PA1744US	8104

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EXAMINER

MCCARTNEY, LINZY T

ART UNIT	PAPER NUMBER
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2671

DATE MAILED: 04/09/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/823,163

Applicant(s)

IOURCHA ET AL.

Examiner

Linzy McCartney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
... Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 6 recites the limitation "...the dynamic search structure..." There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,509,110 to Latham.

- a. Referring to claim 15, Latham discloses a span generator for generating spans for each of the primitive objects, a span corresponding to each horizontal scan line occupied by the primitive object, the span characterized by positional data and depth data (column 3, line 46 – column 4, line 10; column 11, line 51 – column 12, line 4); and a visible surface determination module responsive to the depth data associated with each of the spans, for determining visible segments of each of the spans and for generating position data corresponding to each of the visible segments of the spans (column 12, line 5 - 11).

- b. Referring to claim 16, Latham discloses means for storing the position data corresponding to each of the visible segments of each of the spans and for causing

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storage of depth data corresponding to each of the visible segments of each of the spans (column 6, lines 11-17; column 11, lines 46-50; Fig. 3).

5. Claims 17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,303,386 to Fiasconaro.

a. Referring to claim 17, Fiasconaro discloses a processing device (Fig. 19); a display device coupled to the processing device for displaying the 3D images (Fig. 19 and Fig. 1); a graphics engine coupled to the processing device for performing visible surface determination (Fig. 19 and column 24, lines 33-39); and a storage device for storing the results of visible surface determination (Fig. 19). Fiasconaro also discloses wherein regions of the primitive objects and the associated depth information are defined by analytical functions (column 3, lines 47-57 and column 4, line 57 – column 5, line 8).

b. Referring to claim 20, Fiasconaro discloses wherein the storage device stores the results in a linked-list format (column 2, lines 1-12).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 8-11, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fiasconaro in view of Cheng et al., "Clipping of Bezier Curves" (Cheng).

- a. Referring to claim 1, Fiasconaro discloses representing depth information by a piecewise function (column 4, lines 4-7; column 5, lines 27-34; Figure 1) and upon receiving a primitive object, dividing the primitive object according to areas defined by the piecewise function (column 3, lines 47-57). Fiasconaro does not explicitly disclose performing a visibility test in the areas and updating the piecewise function based on the results of the visibility test. Cheng discloses performing a visibility test in the areas and updating the piecewise function based on the results of the visibility test (page 77, paragraph 2). Note that although the example of Cheng utilizes Bezier curves the method also applies to the B-splines used by Fiasconaro (Cheng, pages 74-75, paragraph 2). At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify the disclosure of Fiasconaro with the teachings of Cheng. The suggestion/motivation for doing so would have been to avoid outputting all the edges of the approximating polygon to the graphics system for clipping (Cheng, page 74, paragraph 1).
- b. Referring to claim 2, Fiasconaro discloses each piece of piecewise function is an analytical function of a predefined class defined by corresponding parameters (column 4, line 56 – column 5, line 7).
- c. Referring to claim 3, Fiasconaro does not explicitly disclose wherein the analytical function is a linear function. Cheng discloses the aforementioned limitation (page 77, paragraph 1). At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify the disclosure of Fiasconaro with the teachings of Cheng. The suggestion/motivation for doing so would have been to avoid

outputting all the edges of the approximating polygon to the graphics system for clipping (Cheng, page 74, paragraph 1).

d. Referring to claim 4, Fiasconaro does not explicitly disclose wherein the analytical function is a non-linear function. Cheng discloses the aforementioned limitation (page 75, paragraph 1; page 77, paragraph 2). At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify the disclosure of Fiasconaro with the teachings of Cheng. The suggestion/motivation for doing so would have been to avoid outputting all the edges of the approximating polygon to the graphics system for clipping (Cheng, page 74, paragraph 1).

e. Claim 8 is rejected with the rationale of the rejection of claim 1. Claim 8 is merely claim 1 recited as an apparatus.

f. Claim 9 is rejected per claim 8 with the rationale of the rejection of claim 2. Claim 9 is merely claim 2 recited as an apparatus.

g. Claim 10 is rejected per claim 9 with the rationale of the rejection of claim 3. Claim 10 is merely claim 3 recited as an apparatus.

h. Claim 11 is rejected per claim 9 with the rationale of the rejection of claim 4. Claim 11 is merely claim 4 recited as an apparatus.

i. Referring to claim 12, Fiasconaro discloses implementing a dynamic search structure for selectively accessing a set of the piecewise function parameters (Fig. 9B).

j. Claim 23 is rejected with the rationale of the rejection of claim 1. Claim 23 is merely claim 1 recited as a program.

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- k. Claim 24 is rejected with the rationale of the rejection of claim 1. Claim 24 is merely claim 1 recited as a system.
- 3. Claims 5, 6, 7 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fiasconaro in view of Cheng as applied to claims 1, 4, and 13 above further in view of Latham.
 - a. Referring to claim 5, the modified method of Fiasconaro as applied to claim 1 above meets the limitations recited in claim 5 except wherein a dynamic search structure is used for fast access to the areas of a split overlapping with the primitive object. Latham discloses the aforementioned limitation (column 6, lines 11-16 and Fig. 2). At the time the invention was made it would have been obvious to one of ordinary skill in the art to further modify the disclosure of Fiasconaro with the teachings of Latham. The suggestion/motivation for doing so would have been to provide a method for occlusion and antialiasing processing that is feasible for all types of database, effective for generating high quality computer graphics, and minimizes the computations required (column 2, lines 35-47).
 - b. Referring to claim 6, the modified method of Fiasconaro as applied to claim 1 above meets the limitations recited in claim 6 except wherein the dynamic search structure is a tree-based structure. Latham discloses the aforementioned limitation (column 6, lines 34-35 and Fig. 2). At the time the invention was made it would have been obvious to one of ordinary skill in the art to further modify the disclosure of Fiasconaro with the teachings of Latham. The suggestion/motivation for doing so would have been to provide a method for occlusion and antialiasing processing that is feasible

for all types of database, effective for generating high quality computer graphics, and minimizes the computations required (column 2, lines 35-47).

- c. Referring to claim 7, the modified method of Fiasconaro as applied to claim 1 above meets the limitations recited in claim 7 except wherein each piece of the piecewise function is defined on a segment of a scanline. Latham discloses each segment of an object being defined on a segment of the scanline (Abstract). At the time the invention was made it would have been obvious to one of ordinary skill in the art to further modify the disclosure of Fiasconaro with the teachings of Latham. The suggestion/motivation for doing so would have been to provide a method for occlusion and antialiasing processing that is feasible for all types of database, effective for generating high quality computer graphics, and minimizes the computations required (column 2, lines 35-47).
- d. Claim 13 is rejected with the rationale of the rejection of claim 6. Claim 13 is merely claim 6 recited as an apparatus.
- e. Claim 14 is rejected with the rationale of the rejection of claim 7. Claim 14 is merely claim 7 recited as an apparatus.
4. Claims 18, 19, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fiasconaro as applied to claim 17 above in view of U.S. Patent No. 6,285,378 to Duluk Jr.
- a. Referring to claim 18, the system of Fiasconaro as applied to claim 17 above meets the limitations recited in claim 17 except wherein the graphics engine further comprises a span generator for generating spans corresponding to each horizontal scanline of the primitive object. Duluk Jr. discloses the aforementioned limitation (Figs. 5 and 6). At the time the invention was made it would have been obvious to one of ordinary

skill in the art to further modify the disclosure of Fiasconaro with the teachings of Duluk Jr. The suggestion/motivation for doing so would have been because it would allow a renderer's pixel drawing computational requirement to be proportional to the number of pixels in the display screen (Duluk Jr., column 4, lines 46-55).

b. Referring to claim 19, Fiasconaro as applied to claim 18 above meets the limitations recited in claim 19 except Fiasconaro does not explicitly disclose the graphics engine further comprises a visible surface determination module coupled to the span generator for determining visible segments for each span. Duluk Jr. discloses the aforementioned limitation (Figs. 5 and column 11, lines 10-14; column 13, lines 42-50). At the time the invention was made it would have been obvious to one of ordinary skill in the art to further modify the disclosure of Fiasconaro with the teachings of Duluk Jr. The suggestion/motivation for doing so would have been because it would allow a renderer's pixel drawing computational requirement to be proportional to the number of pixels in the display screen (Duluk Jr., column 4, lines 46-55).

c. Referring to claim 22, Fiasconaro does not explicitly disclose wherein the results comprise information indicative of relative depth of a first visible segment in relations to a second visible segment. Duluk Jr. discloses the aforementioned limitation (column 13, lines 42-50; column 17, lines 39-49; Fig. 10). At the time the invention was made it would have been obvious to one of ordinary skill in the art to further modify the disclosure of Fiasconaro with the teachings of Duluk Jr. The suggestion/motivation for doing so would have been because it would allow a renderer's pixel drawing

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computational requirement to be proportional to the number of pixels in the display screen (Duluk Jr., column 4, lines 46-55).

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fiasconaro as applied to claim 17 above in view of Latham further in view of U.S. Patent No. 6,512,516 to Schill et al. (Schill).

a. Referring to claim 21, the method of Fiasconaro as applied to claim 17 above does not explicitly teach wherein the storage device stores the results in a binary tree format. Latham discloses the aforementioned limitation (column 6, lines 34-35 and Fig. 2). At the time the invention was made it would have been obvious to one of ordinary skill in the art to further modify the disclosure of Fiasconaro with the teachings of Latham. The suggestion/motivation for doing so would have been because it would make it relatively fast and easy to insert and find elements (Schill, column 5, line 22-26).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Linzy McCartney** whose telephone number is **(703) 605-0745**. The examiner can normally be reached on Mon-Friday (8:00AM-5:30PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Mark Zimmerman**, can be reached at **(703) 305-9798**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

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(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

ltm

April 2, 2003


MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600